KISSsoft & KISSsys
Gear Design Software

www.KISSsoft.ch
Jiri Dolejs, SEW Eurodrive CZ, Czech Republic:
“The calculation program KISSsoft has been used in SEW Eurodrive CZ company since 2004 on two seats of node locked licenses. Thanks to the modular structure of KISSsoft and wide variety of calculation modules, it is possible to assemble a tool for technical calculations tailored exactly according to user's needs, alternatively according to customer's needs. In case of necessity, it is possible to add another compatible module. Since the beginning of our usage of this software, KISSsoft has undergone many changes. New functions are added on regular base and the current functions are improved.

Sonja Goris, ZF Wind Power Antwerp NV, Belgium:
„As a leading wind power drive manufacturer, we are delighted to work with KISSsoft. We use the KISSsoft software on an ongoing basis, along with other software suites, when developing our drives for wind power units in the 1.5 to 6+ MW range. We particularly appreciate the range of functions provided by KISSsoft, and its user-friendly interface, which means that the variant and certification calculations are performed in a clear and easy to understand manner. “

Tomasz Wróblewski, FLSmidth MAAG Gear Sp. z.o.o., Poland :
„We are a large gear manufacturing company. The KISSsoft and KISSsys calculation software suites are an essential part of our business and are used together with our own specialized in-house toothing software programs. We use KISSsoft's highly efficient sizing functions to size the toothings. KISSsoft can even handle the calculations involved in shaft and bearing calculations for use in heavy industry. “

Edwin C. Hahlbeck, Powertrain Eingeers Inc., Wisconsin, USA:
„As you know, we have been early users of KISSsoft programs here in the USA. As consultants engaged in gearbox design for energy, mining, industrial, telescopes, turbo equipment and other applications we are using your software most every day. It is solid and dependable, broad in scope, integrated well and continuously improving. At our firm we use all the gear rating programs, shaft analysis and bearing design extensively. The fit analysis is also very important with calculation of micro-slippage and added bonus. The software has incredible depth and flexibility. It's obvious to me that it comes from experienced engineers who have been there and done that. We have used it in submittals for review by API, DNV and GL without ever a question related to this product. We have found the support for problems or questions to be exceptional, and handled well by staff that quickly interprets our needs, typically on first communication. We recommend this product for static analysis for anyone engaged in mechanical design, without reservation. “
KISSsoft worldwide

History
✓ Started as in house software with Kissling AG gear company
✓ KISSsoft AG founded in 1998
✓ KISSsoft LLC, US, founded in 2005
✓ EES KISSsoft GmbH, founded 2008
✓ KISSsoft China Pvt Ltd, founded 2012
✓ KISSsoft software has been commercially available for the last 27 years
✓ About 2600 commercial installations worldwide
✓ About 150 educational installations worldwide

Main office
✓ KISSsoft AG, Switzerland
✓ www.KISSsoft.ch

US branch
✓ KISSsoft LLC, USA
✓ www.KISSsoft.com

China branch
✓ KISSsoft China Pvt. Ltd., China
✓ www.KISSsoft.com.cn

General distributor Asia
✓ EES KISSsoft GmbH, Switzerland
✓ www.EES-KISSsoft.ch

Sales and support partners
✓ Estudio Pina, Argentina
✓ CETIM, France
✓ Stadler Antriebstechnik, Germany
✓ Mr. Saltini, Italy
✓ Mega Makina, Turkey
✓ Kadkraft Systems, India
✓ STech&H, Korea

Consultancy and engineering
✓ Provided through EES KISSsoft GmbH
✓ Contact h.dinner@EES-KISSsoft.ch
✓ Specialised in wind gearboxes, industrial gearboxes and slewing bearings
✓ Design, engineering analysis and testing
Applications
Fine pitch, plastic and sintered gearing
✓ White and brown ware
✓ Gearheads
✓ Automotive actuators
✓ Medical and research
✓ Powertools
✓ ...

Energy generation
✓ Turbo gears
✓ Wind energy, main gearboxes
✓ Generator shafts
✓ Engine gear trains
✓ Pitch and yaw drives
✓ ...

Aerospace
✓ Rovers, satellites
✓ Helicopter transmission
✓ Turbine PTO
✓ Flap actuators, UAV
✓ ...

Industrial
✓ General purpose and heavy duty gearboxes
✓ Mining and raw materials
✓ Cranes and winches
✓ Vertical roller mill gearbox
✓ Steel mill gearboxes
✓ Servomotors, geared motors
✓ Robotics, spindle drives
✓ Material handling
✓ Open gears
✓ ...

Vehicle applications
✓ Automotive, LCV transmissions
✓ Trucks and busses
✓ Tractors, harvesters
✓ Motorbikes and three wheelers
✓ Motorsport
✓ Military vehicles, armoured vehicles
✓ Locomotives, trams, cableways
✓ Construction vehicles, forklifts
✓ ...

And many more...
**Training**

**Form**
- Public trainings in German, Korean, French, Italian, Spanish or English language
- Company specific trainings
- At KISSsoft AG training centre

**Topics**
- KISSsoft & KISSsys software usage
- KISSsys programming
- Gear theory, gear design technology
- Fine pitch gearing

**Trainers**
- Mechanical engineers with strong engineering background
- Long time software users or programmers

**Maintenance and support (AMC)**

**Services**
- Software updates
- Patches
- Installation support
- Software support (software usage)
- Technical support (software application)

**Types**
- Perpetual (by service contract)
- Annual renewal

**Software modules**

**Combination of modules**
- Basic modules for gearing, shafts, connections
- Expert modules as add-on modules
- Total of about 50 modules

**Adding modules**
- Modules may be added to an existing licence

**Complete list of modules**
- Request through reseller or directly from EES KISSsoft GmbH
**Modules**

**General**
- KISSsoft modules can be run independently
- KISSsys module requires KISSsoft
- CAD modules require KISSsoft

**KISSsoft**
- Cylindrical gears, rack & pinion, bevel and hypoid gears, worm gears, face gears, crossed axis helical gears, non-circular gears
- Shafts and roller bearings, hydrodynamic bearings, shaft systems, bearing stress
- Shaft-hub connections
- High strength bolted connections
- Spring analysis, chains and belts
- Tolerance stack up, local stress analysis, Hertzian contact stress, spindles

**KISSsys**
- Readymade gearbox models for helical gearboxes, bevel-helical gearboxes, worm-helical gearboxes and planetary systems
- Machine element library to build own models
- Programming language module
- Let's you build virtually any gearing system

**CAD**
- Accurate, manufacturing simulation based 3D geometry of gears
- 2D CAD export in neutral format or graphical format
- 3D export to CAD systems (gear geometry)

**Databases**

**General**
- Database is user editable and can be transferred from one release to next
- Includes copy past functions

**Materials**
- General material database
- Specific materials for gears, shafts, springs

**Bearings**
- FAG/INA, SKF, Koyo, NSK, Timken
- For standard bearing data and bearing inner geometry (only through user input)
KISSsys, systems module

KISSsys software combines kinematic analysis, lifetime calculation, 3D graphics, user defined tables and dialogs with a programming language. It is the tool of choice for strength and lifetime analysis of various kinds of drive trains and gearboxes. KISSsys lets the user do quick yet detailed parametric studies of a complete power train in very little time to compare different variants of a concept or to analyse a given design for different loads.

In KISSsys, all parts (gears, shafts, bearings, connections) of the gearbox are linked and the strength/lifetime analysis is performed simultaneously for all elements. A three dimensional graphical presentation of the current state of the system immediately shows the geometrical influence of every change in parameters. This approach greatly accelerates the design process and results in a much more balanced design even during the concept phase.

The machine elements calculated range from gears, shafts, bearings, shaft-hub connections to bolts. This will result in a more balanced starting design and fewer modifications will be necessary further down in the design process to reach an optimised design. Furthermore, documentation of the calculation is simplified and all calculation data for a whole drive train or gearbox is stored in a single file. KISSsys uses KISSsoft for the strength and lifetime calculations of the various machine elements.

KISSsys features:

Kinematics Calculation:
- Power flow / speed with spur, bevel, worms and face gear stages,
- Modelling of rotational mechanisms (planetary, Ravigneaux, Wolfrom,...),
- Differentials, (with bevel or spur gears), chain and belt transmissions,
- Couplings can be activated and deactivated, slippage taken into account
Integrated strength and lifetime calculation:
- With integrated KISSsoft calculation modules
- System deflection is considered in tooth contact analysis

Machine element library:
- Spur/helical gear pair
- Planetary gears, compound planetary gears
- Bevel and hypoid gears
- Worm gears, crossed axis helical gears
- Face gears
- Shaft-bearing systems
- Shaft-hub connections
- Synchronizer

3D-models:
- Automatic 3D-display (based on the data defined in KISSsoft),
- 3D-model export to CAD platforms, gearbox housing import, (-step / -iges),
- Collision check with imported CAD geometry

Special features:
- Calculations with load spectra for all machine elements in the model
- Integrated programming language for implementation of special functions
- Animation of gear movement
- Cut view and deformed systems
- Wizards, libraries and toolboxes for quick modelling

KISSsys is used e.g. to
- Analyse wind turbine gearboxes again and again for different loading conditions
- Ensure that the design of a plastic gear set for an automotive actuator fits into a given design space
- Calculate power flow in CVT transmission
- Maintain a database of geared motor gears
- Estimate the manufacturing cost of a gearbox even during the design phase
- Optimise bearing lifetime by variation of the gears positions on a shaft
- Create specific reports e.g. for certification
- And many more ...
GPK module

GPK module is a set of readymade KISSsys models. The models are provided to the customers as a library to be used in KISSsys. The models made available cover the most typical industrial gearboxes. The models feature advance level functions to accelerate the design process of standard industrial gearboxes. The need for the user to build his own models is eliminated and detailed reporting functions further reduce the time to document the design. Automatic sizing functions for the gears, bearings and shafts result in a well balanced gearbox. Price calculations based on user defined cost per mass data allow for constant control over gearbox costs.

Types of gearboxes
- Helical gearboxes
- Bevel, helical-bevel gearboxes
- Worm, worm helical gearboxes
- Planetary gearboxes

Configurations
- One, two, three, four or five stage helical gearboxes, with or without roller bearings
- One bevel without, with one, two or three helical stages, all with roller bearings
- One worm without, with one, two or three helical stages, all with roller bearings

Functions
- Sizing of gear stages (distribution of ratio among the stages, sizing for given centre distance)
- Sizing of shafts and bearings (based on stress levels and required bearing life)
- Cost estimation (considering bearings, shafts and gears)
- Report generation (summary, pricing and detailed report)
- Detailed gear, bearing and shaft design through KISSsoft
- Free arrangement of shafts in space
- External forces on input and output shaft
- Settings for lubrication, temperature, orientation of gearbox in space, materials, calculation methods and graphics
Helical gear basis modules

Configurations
- Spur or helical gear, herringbone gear, considering face width offset
- Grease or oil lubricated or dry running gears
- Metallic or plastic gears
- Involute or non-involute gears
- Any number of teeth, any type of tooth height, internal or external gears

Gear geometry calculation
- Gear geometry along ISO21771
- Reference profile along ISO53.2, DIN867, JIS, BS5482 or own input
- Tolerances along DIN3967, ISO1328, own input or for theoretical gearing
- Centre distance along ISO286, ISO7168, DIN58405 or own input
- Gear quality along ISO1328, AGMA2015-1-A01, DIN3961, DIN3961, DIN3963, DIN23961, DIN23962, DIN23962, AGMA200-A88

Gear rating
- Static rating against yield
- AGMA2001-B88, AGMA2001-C95, AGMA2001-D04, AGMA2101-D04 metric
- AGMA6004-F88, AGMA6014-A06, AGMA6011-I03
- Plastic gears along Niemann, VDI2545, VDI2545 modified, VDI2736
- As FVA software for DIN3990
- BV/Rina FREMM3.1, Rina 2010, DNV41.2
- For nominal load or load spectrum

Report listing
- For default report or user specific template
- Tooth geometry and material
- Tooth root strength, tooth flank strength
- Tooth scuffing, micropitting and wear
- Tooth thickness dimensions, tooth tolerances
- Modifications, manufacturing
- Additional data
Cylindrical gear general modules

Gear geometry calculation
- Calculation based on gear or tool reference profile
- Calculation based on true tool geometry
- Calculation based on mating gear geometry
- Import and export of gear or tool geometry from CAD system
- Calculation of theoretical, acceptance and operating backlash for metallic and plastic gears and housings

Load spectrum calculation
- Direct input of load spectrum or import from text or Excel file
- Up to 300 load steps in spectrum
- Calculation of lifetime based on required safety factor, safety factors based on required lifetime and permissible torque based on required safety factor and lifetime
- Calculation of partial damages
- For DIN3990, ISO6336 and AGMA2001

AGMA925 calculations
- Calculation of scuffing safety
- Calculation of contact stress, lubricant film thickness

Micropitting calculation
- Micropitting rating along ISOTR 15144
- Specific lubricant film thickness calculation along AGMA925
- Lubricant film thickness calculation along ISOTR 15144 based on true contact stress

Additional reports
- Gear data for drawings
- Manufacturing tolerances along ISO1328-1, ISO1328-2, DIN3961, DIN23961, AGMA2015-1, AGMA200, BS436-2
- Proposal for hardness depth along Niemann, AGMA2101, ISO6336
- User specific reports based on templates

Master gear calculation
- Calculation of master gear geometry
- Meshing of master gear with gear
Helical gear sizing modules

Configurations
✓ Sizing functions to find optimised gears (in terms of mass, power density, stiffness, space requirements)
✓ Functions to reverse engineer gears
✓ Functions to optimise gear properties

Rough sizing
✓ Proposal of several gear solutions for required power rating, required ratio, given material
✓ Considers gear quality, permissible ratio error
✓ For single load level or load spectrum
✓ With standard reference profile

Fine sizing
✓ Define permissible ranges for module, pressure angle, helix angle, centre distance and profile shift
✓ Define target ratio and permissible deviation
✓ Define maximum number of solutions
✓ Set maximum permissible tip diameter and minimum permissible root diameter
✓ For pre-defined number of teeth or varying number of teeth
✓ Different filter and sorting functions
✓ Display solutions in table or in graphical form
✓ Report with assessment of solutions for different criteria

Centre distance sizing
✓ Sizing from gear pair data
✓ Sizing for target profile shift sum

Sizing of profile shift
✓ For balanced specific sliding
✓ To avoid pointed tooth or undercut
✓ For turbo gears
✓ For maximised strength on flank or root or maximised scuffing strength

Sizing of tooth height / reference profile
✓ Sizing of reference profile for target transverse contact ratio
✓ Sizing of maximum possible root radius

Sizing of profile and lead corrections
✓ Sizing of tip and root relief for different shapes
✓ Sizing of end relief and crowning
✓ Automatic search for optimum corrections
Helical gear modifications

Configurations
- Considers all modifications in profile and lead direction
- Calculation based on up to 41 gear sections
- Pitch errors may be considered in part or fully
- Calculation for nominal or operating centre distance
- Calculation for nominal or partial load level
- Meshing friction considered in calculation
- Considers true gear geometry from manufacturing simulation

Output
- Calculation of load distribution in profile and lead direction
- True stress levels compared to stress levels calculated along standards (ISO/DIN/AGMA)

True root stress calculation
- Calculation of YS and YF along full tooth root
- Considering true root geometry from manufacturing
- Root geometry optimisation for minimised root stresses

Calculation along ISO/TR 15144
- Calculation of specific lubricant film thickness $\lambda$ along g ISO/TR 15144
- Considering true contact stress, temperature in contact, surface roughness and lubricant properties
- Calculation of micropitting safety, method A and B

Lead and profile modifications
- End relief (left and right end)
- Crowning
- Helix angle modification
- Linear and progressive tip/root modification
- Profile crowning (barrelling)
- Pressure angle modification
- Tip chamfer or rounding
- Grinding disk plunge depth
- Graphical output in involute diagram
- Flank twist
- Triangular end relief (left and right end)
Helical/planetary, contact analysis

Configurations
- Considers all modifications in profile and lead direction
- Calculation based on up to 41 gear sections
- Pitch errors may be considered in part or fully
- Calculation for nominal or operating centre distance
- Calculation for nominal or partial load level
- Meshing friction considered in calculation
- Considers true gear geometry from manufacturing simulation
- For internal and external gears
- User defined accuracy level in calculation

Mesh stiffness calculation
- Calculation of Transmission Error for spur and helical gears, showing peak to peak transmission error, average and standard deviation
- Calculation of normal force, torque variation, contact stiffness, bearing forces, kinematics, specific sliding and local heat generated over meshing cycle
- Results displayed vs. roll angle, pinion diameter, length on line of action, pinion angle of rotation
- Calculation has been verified in benchmarks against reference software, practical experience in full load tests and FEM calculations

Output
- Graphics, exportable as graphic format or dxf
- Report including calculation settings and results summary
- Report including all graphics

True contact ratio calculation
- Calculation of true transverse contact ratio under load
- Calculation of true total contact ratio under load
Planetary, herringbone, idlers

General, planets
- Based on helical gear calculation modules
- Calculation of planet pin location for non-evenly spaced planets
- Influence of rim thickness of ring gear and planet gears considered
- Assembly check
- Sizing function for load distribution factor along AGMA6123
- Rough and fine sizing function

Strength rating, planets
- Along ISO6336, DIN3990, AGMA2001, AGMA6004, BV/Rina FREMM3.1 for metallic gears
- Along VDI2545 and Niemann for plastic gears
- Calculation of ring gear strength along VDI2737
- Calculation of alternating bending factor for planet root

General, idler gears, herringbone gears
- Based on helical gear calculation modules
- For one or two idler gears
- Load input on first, output on last gear

Worm gear modules

General
- For ZC, ZI, ZA, ZN, ZK, ZH geometry
- Includes rough and fine sizing function
- Accurate 3D geometry

Strength rating
- No load contact analysis

System data
- Considers drive direction, bearing power loss, seal loss, permissible wear
- Considers cooling through housing and lubricant and running time
Bevel gear modules

General
- Strength rating for nominal load or load spectrum
- Database for reference profile and tolerances
- Different geometry configurations with uniform tooth depth, constant slot width, modified slot width, different root and tip apex positions
- For spur, helical or spiral bevel gears
- Rough and fine sizing function
- Calculation of measurement grid for Klingelnberg, Gleason or Wenzel gear tester

Strength rating
- Strength rating along ISO10300, Method B and C, DIN3991, AGMA2003, CN3028/KN3030 for Cyclo-Palloid gears and along KN3025/KN3030 for Palloid gears
- Hypoid gear calculation along KN3029/KN3030 for Cyclo-Palloid gears, KN3026 for Palloid gears, ISO10300
- Plastic gear rating along VDI2545 or Niemann
- Static strength rating and rating of differential planetary gears, efficiency along Wech
- Flank breakage calculation along Annast

Manufacturing
- For face hobbed or face milled gears
- Considering Klingelnberg machine list
- Accurate 3D gear geometry for CNC machining
- No load tooth contact analysis considering lead and profile modifications

Rack and pinion modules

For spur or helical arrangement

Strength rating
- Along ISO6336, DIN3990, AGMA2001, AGMA6004, BV/Rina FREMM3.1 for metallic gears and VDI2545 and Niemann for plastic

Output
- Reports for manufacturing tolerances, drawing data, hardness depth proposal
**Crossed axis helical gear modules**

General
- Strength rating along ISO6336 (modified along Niemann), along Hoechst for worm gears and along Hirn for worm gears
- Calculation of theoretical backlash, acceptance and operating backlash
- Calculation of flank, root and scuffing safety factor with single load or load spectrum
- Output of control measures like dimension over pins and balls
- With rough and fine sizing function

Configurations
- For plastic and metallic materials
- Calculation with lead or helix angle
- Calculation of meshing efficiency
- For worm type or helical gear type mesh (any helix angle)
- Tooth form calculation with modifications like tip and root relief, chamfer, tip rounding, elliptic root rounding for improved noise and strength properties

**Face gear modules**

General
- Strength rating along ISO6336 (modified along Niemann, Roth and Basstein), ASS/Crown Gear/DIN3990, based on ISO10300, based on DIN3991
- For 90deg or other shaft angle, with axis offset, for spur and helical gears

Configurations
- Crown gear with cylindrical pinion as spur or helical gear
- Calculation of crown gear geometry at different diameters by simulating manufacturing with a pinion type cutter
- Check against undercut and pointed tooth by varying tooth height
- Export of 2D or 3D geometry considering tolerances
- Crowning of face gear through modifications on pinion type cutter
- Output of contact lines on face gear
Non circular gears
Non circular gears can be calculated in KISSsoft based on an operating pitch curve. Gears may be closed or open.
Note that this module is available to customers as a package if combined with a joint project in order to ensure that the software does meet the customer requirements.

Design of geometry:
✓ required momentary ratio may be defined
✓ required meshing curve may be defined

From there, the following is calculated
✓ calculation of meshing curve from momentary ratio
✓ calculation of shaping cutter from gear/tooth data
✓ calculation of backlash such that no jamming occurs
✓ calculation of non-circular gear contour
✓ export to CAD with different levels of accuracy (up to 800 points per flank)
✓ add tip rounding
✓ modify root geometry to increase strength
✓ check of meshing / collisions in 2D
✓ calculation of position of rolls for dimension over rolls measuring

Beveloid gears
Beveloid gears (conical gears) can be modelled and rated in KISSsoft for small shaft and cone angles
✓ Cone angle on both gears may be different
✓ Considers shaft and cone angles
✓ Spur and helical gears
✓ Includes microgeometry model
✓ Strength rating as per DIN, ISO, AGMA based on equivalent cylindrical gear
✓ No load tooth contact analysis
Shaft modules

General
✓ Graphical shaft editor for fast modelling
✓ Add features to shaft to define stress concentrations
✓ Add force elements like gears, pulleys or couplings for simple load definition
✓ Material and lubricant database
✓ Search function for critical cross sections

Configurations
✓ Single shaft or shaft systems
✓ Combined with multiple roller bearings
✓ Different materials from database or own input
✓ Linear or non-linear calculation with Euler or Timoshenko beam model considering temperature effects

Strength rating
✓ Strength rating along DIN743, FKM guideline or Hänchen & Decker
✓ For static and fatigue strength, for single load case or load spectrum
✓ Using material database or own definition for S-N curve
✓ Automatic recognition and calculation of stress concentrations

Buckling, natural frequencies
✓ Calculation of combined bending and torsion natural frequencies and natural modes
✓ Considers bearing stiffness

Deformation and stiffness calculation
✓ Non-linear bearing stiffness is considered based on inner bearing geometry
✓ Up to eight concentric shafts may be modelled with connections
✓ Any number of loads may be added

Tooth trace calculation
✓ Calculation of shaft deformation of pinion shaft, calculation of necessary lead correction
✓ Housing stiffness, bearing stiffness and shaft stiffness may be considered
Bearing modules

Configuration
- Calculation of single bearing or bearing-shaft system
- With single load or load spectrum
- Sizing function for bearing selection
- Statically over-determined shaft systems, paired bearings

Bearing life rating
- Basic rating using load capacity numbers
- Modified rating considering lubricant properties
- Reference rating considering load distribution
- Modified reference rating
- Along ISO281, ISO/TS16281, ISO76

Bearing stiffness
- Based on bearing inner geometry
- Shaft-bearing interaction for shaft and bearing systems
- Considers clearance/pre-tension
- Considers bearing, shaft, hub tolerances

Load distribution calculation
- Load distribution among rolling elements
- Contact stresses for balls
- Contact stresses for rollers, considering roller geometry modification (logarithmic)

Thermal rating
- Along DIN732

Bearing database
- Bearing data from different bearing suppliers
- For different bearing types
- Database for basic bearing properties
- Database for bearing inner geometry, user editable
- Separate database for lubricants, lubricant purity definitions along ISO4406

Hydrodynamic bearings
- Axial bearings according to DIN31653
- Radial bearings along DIN31654, Niemann and Spiegel (for grease lubricated bearings)
Shaft-hub connections modules

Cylindrical interference fit
- Strength rating along DIN7190
- Sizing function for tolerances
- Stress calculation for stepped hub and hollow shaft
- Considers torsional, radial and bending load, including centrifugal loads
- Calculation of mounting temperatures

Conical interference fit
- For different mounting procedures
- Calculation along Kollmann
- Considers cone angle and cone angle tolerances

Key
- Geometry along DIN6885, ANSI B17.1
- Strength rating along DIN6892
- Woodruff key

Involute spline
- Geometry along DIN5480, ISO4156, ANSI B92, own definition
- Tolerances along DIN5480, ISO4156, ANSI B92, own definition
- Reference profiles along DIN5480, ISO4156, ANSI B92, own definition
- Strength rating along Niemann or DIN5466
- Graphical output

Straight sided spline
- Geometry along DIN5464, DIN5471, DIN5472, ISO14, own definition
- Strength rating along Niemann
- Graphical output

Serrated spline
- Geometry along DIN5481
- Strength rating along Niemann

Polygons
- 3-sided and 4-sided polygon along DIN32711, DIN32711
- Strength rating along Niemann
High strength bolting modules
Bolt rating along VDI 2230, configurations
✓ Connection under axial load only
✓ Connection under axial and shear load
✓ Flange type bolted connection
✓ Arbitrary bolting pattern
✓ Import of FEM results for loading condition

Bolt, nut and washer types
✓ Own bolt geometry definitions
✓ Own nut and washer definition
✓ Washers: ISO 7089, ISO 7090, ISO 7093, ISO 940
✓ Bolt: ISO 4762, ISO 4014, ISO 4017, ISO 1207, ISO 8765, ISO 8676, ...
✓ Strength classes, 8.8, 10.9, 12.9, A1...A5, own definition

Tightening
✓ Considers different tightening procedures
✓ Considers pre-tension loss
✓ Considers friction in thread and under head/nut

Temperatures
✓ For low and high temperatures
✓ Considers assembly temperature, temperature of bolt and temperature of clamped parts

Shear pins, circlips
Calculation along Niemann / Seeger, configurations
✓ Bolt under shearing
✓ Cross pin under torque
✓ Longitudinal pin under torque
✓ Pin under bending
✓ Shear pin system
✓ Hub and shaft circlip

Calculations
✓ Static or fatigue loads
✓ For full or notched type pins
✓ Material database
✓ Sizing function for pin diameter
Springs modules
Compression springs
- Geometry along DIN2098 or own definition
- Tolerances along DIN2095 or DIN2096
- Calculation along EN 13906-1

Tensile springs
- Different end geometries
- Tolerances along DIN2097 or DIN2096
- Calculation along EN13906-2

Garter springs
- Tolerances along DIN2194
- Calculation along EN13906-3

Spring disks
- Geometry along DI2093 or own definition
- Calculation along DIN2092

Torsional spring
- Different head forms
- Single or multiple springs
- Calculation along 2091

General purpose modules
Hertzian contact
- Contact between balls, cylinders, ellipsoid and plane
- Calculation of contact ellipse dimension
- Calculation of contact stress and sub-surface stress

Local stress analysis
- Strength verification along FKM guideline
- For steel and aluminium
- For 1, 2 and 3 dimensional stress state

Tolerance analysis
- Min/Max values, statistical calculation
- Standardised or user defined tolerances

Belt drives, chain drives
- Chain sprocket geometry
- Belt and chain length
- Belt and chain strength
CAD interfaces

KISSsoft offers the following CAD interfaces:

Thus, at the pressing of a button, the gears defined in KISSsoft can be exported to any of the above mentioned CAD platforms. Gear Geometries supported are indicated above.

A gear can be generated for an existing construction or, simply, as a new part. Gears are generated by polylines, circular arc approximation or splines. The exact tooth profile is generated by manufacturing simulation considering tools like shaping cutter or protuberance hob. In addition, it is possible to place several gears on shafts already modelled in the CAD environment.

Neutral interfaces in 2D and 3D formats complete the CAD-specific export functions.
Export to FEM

Supported formats
✓ 3D, step
✓ 3D, sat
✓ 2D, dxf

Import of
✓ Single parts
✓ Multiple parts

Automatic import into most FEM pre-processors.

Mesh seeds on part or edges or global mesh size definition depending on pre-processor used

Parts may be partitioned for control of mesh density in different regions of the gear or tooth

Imported geometry includes profile and lead modifications, root geometry simulated from manufacturing, inner diameter, tip chamfer or rounding

Imported geometry may be based on upper, mean and lower
✓ Tooth thickness tolerance
✓ Tip diameter tolerance

Accuracy is better than 0.1um
Export to CAM

KISSsoft includes a highly accurate and a highly detailed modeller for 3D gear geometries. Based on the geometry generated in KISSsoft, mould cavities, electrodes or final parts may be machined using 5 axis CNC machines.

For most gears, the 3D models can be generated including a protuberance to facilitate a roughing and a final machining operating.

Gears or cavities successfully machined by our customers include

- Spur, helical and herringbone gears
- Spur, helical and spiral bevel gears
- Bevel gears with constant or varying tooth height
- Spur and helical face gears
- Worm gears (different shapes)

Geometries may be imported into any CAM software. Imported geometry includes profile and lead modifications, root geometry simulated from manufacturing, inner diameter, tip chamfer or rounding. Accuracy is better than 0.1um.

Tests have confirmed that contact patterns of e.g. spiral bevel gears are matching with predictions calculated in KISSsoft.

Request specific information and technical papers on the subject from your local agent.

Gear geometry measurement may be controlled using KISSsoft measuring data (flank and root coordinates on measurement grid) and point normal vectors exported in different formats (e.g. to suit Klingelnberg, Gleason or Wenzel gear testers).
Licensing
Types of licenses
✓ Single user license protected by USB dongle (hardware locked)
✓ Single or multi user network license (with license on server)
Installation
✓ Hardware locked license: software is installed and run on PC
✓ Floating license: software can be installed on server or on clients
Operating system
✓ Windows (XP or later)
✓ 32 or 64 bit systems

Documentation, publications
Downloadable documents from www.EES-KISSsoft.ch/download
✓ White papers and application reports
✓ KISSsoft and KISSsys tutorials
✓ List of software modules
✓ Screenshots of software

Documentation
✓ Manual, 1100 pages
✓ Tutorials, about 120 pages

Languages
✓ Tutorials available in German, English, French, Italian and Chinese

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